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STUDIES IN THE AMERICAN EPHYDRIDAE (DIPTERA)

BY E. T. CRESSON, JR.

This general title is selected to cover a series of systematic papers treating of all the North and South American genera and species of the dipterous family Ephydridae known to the author. Each paper of the series will be complete in itself in the form of a revision of one or more genera. At the end of the series a general summary will be given, comprising notes on the systematical relationships and arrangement, and a table of the known genera occurring in the Americas.

The material upon which this series of papers is based has been accumulating for more than six years and is no doubt the most extensive collection in this family ever gotten together for study. This is due largely to the generosity of those individuals and institutions who have patiently allowed the author to retain their material for so long a period. For this privilege the author feels deeply appreciative, and trusts this mention will suffice in lieu of individual acknowledgment. Following is a list of individuals and institutions who kindly placed their collections at the author's disposal. The abbreviation in brackets [ ] following each, is that used in the list of specimens examined given under each species to indicate the source of such material. The source as given does not in every case indicate ownership, but rather refers to the individual or institution through whom the material was secured for study.

Prof. J. M. Aldrich, [Aldrich]; Nathan Banks, [Banks]; Erich Daecke, [Daecke]; H. S. Harbeck, [Harbeck]; C. W. Johnson, [Johnson]; W. L. McAtee, [McAtee]; M. C. Van Duzee, [VanD]; The American Entomological Society, [A. E. S.]; The American Museum of Natural History, [A. M. N. H.]; The Academy of Natural Sciences of Philadelphia, [A. N. S. P.]; The Boston Society of Natural History, [B. S. N. H.]; University of California, [Cal.]; Cornell University, [C. U.]; The Hungarian National Museum, [H. N. M.]; Illinois State Laboratory of Natural History,

[Ill.]; University of Kansas, [Kans.]; University of Nebraska, [Neb.]; Ohio State University, [Ohio]; United States National Museum, [U. S. N. M.]; Washington State College, [Wash.].

It may be well to explain that in the list of specimens examined under each species, the sequence of citation and punctuation is as follows: Locality, date of collecting, (collector), number of specimens, [source]. Although some of the data may be wanting there should be no confusion in understanding the citation. The list of the specimens examined always include the typical series in case of new species or forms.

I. REVISION OF THE SPECIES OF THE GENUS PARALIMNA

It is with much hesitancy that I undertake to publish a synopsis of the species of this difficult genus at this time, but owing to the recent acquisition for a limited time of an extensive collection, I feel that it will not profit much to withhold the results of my study. The genus is very discouraging to the student on account of its homogeneousness. I have been compelled time and again to lay it aside after repeated attempts to separate the mass of material into satisfactory species. This is especially true respecting the *appendiculata*-group. It will take a great deal of study with much more material from all possible localities to obtain more satisfactory results. However, I feel that this somewhat preliminary study will throw some light on the classification of the species of this genus.

PARALIMNA Loew

1862. *Paralimna* Loew, Mon. N.A. Dipt., i. 138.
1862. *Paralimna* Loew, Öfver. Kong. Vet.-Akad. Forh., 13.
1896. *Paralimna* Becker, Berl. Ent. Zeit., xli, 114.

This genus belongs to the Notiphilinae of the group Notiphilae, a group including the genera *Dichaeta* and *Notiphila*.

The position of the genus is rather isolated. It is not interrelated to any of the others so far as our present knowledge goes. Its closest ally is *Dichaeta*, apparently through the abbarent *Paralimna decipiens* and its allies. On the other hand may be observed the similarity to *Discocerina* in the frontal characters and the arrangement of the setulae and macrocheatae of the mesonotum. However, the erect extensor bristles on the middle

femora (fig. 3) and the unusually long mesopleural bristles at once decide its membership in the Notiphilae. Further notes on the position of this genus will be discussed in the systematical summary which I intend to give at the end of this series of papers. The primary characters of the genus are the presence of three extensor bristles on the middle tibiae (fig. 3) and the continuation of the costa to the fourth vein (fig. 1).

Generic Description.—Robust, mostly large species. Head generally broader than high, higher than long. Eyes bare generally rounded. Frons broad, with parallel orbits: vertex rounded; ocelli situated slightly in advance of the vertical angle, with a pair of post-ocellar bristles diverging; the usual ocellars well separated, parallel, situated in advance of, or opposite the anterior ocellus; inner and outer verticals strong, also distinct occipito-centrals present; a strong reclinate frontal and two or three proclinate orbitals of which the anterior one is the strongest. Anterior portion of frons more or less setulose or hairy. Face broad, bare medianly; foveae shallow; facalia scarcely differentiated, setulose, with a series of one or more incurved bristles along inner margin, the uppermost of which is the largest; parafacial groove sharp and well defined to oral margin. Cheeks generally broad with distinct bristles; lower occiput moderately swollen. Clypeus always visible, moderately broad. Palpi cylindrical. Antennae short; second joint subglobular, without distinct apical "thorn"; third joint hardly twice as long as broad; arista long with long hairs above.

Thorax quadrate, dorsum convex, wholly setulose; no acrostichals; one pair of prescutellars; one anterior and two posterior dorsocentrals; one humeral (long); one presutural; one supra- and one post-alar; two noto- and two or more meso-pleurals, one of the latter being very long; one sterno-pleural. Scutellum flat, roundly truncate apically with four long marginal bristles. Abdomen broad as thorax, with five to six segments; fifth of male convex, truncate; genital segments inconspicuous. Legs slender; fore femora of male sometimes characteristically ciliate beneath; middle tibiae of both sexes with three erect extensor bristles, one at each extremity and one before middle. Wings elongate, slightly overreaching abdomen; costa broken just beyond humeral c. v., slightly notched at first, and extends to tip of wing at fourth vein; second, third and fourth veins generally straight. Allulae narrow.

Genotype.—The name for this genus was used for the first time in 1862, in two separate publications, given in the above bibliography under the genus, without direct reference to each other, so that one, unless knowing dates of issue of the two, is at a loss to determine which reference has priority. It will depend upon the actual dates of issue of these publications as to which of three species can be used as the genotype. Osten Sacken in a foot note in his Catalogue of the North American Diptera, 1878,

page 201, considers the Öfversigt as having priority, but as the name *Paralimna* is given only in combination with the newly described species, without any diagnosis, he does not consider such citation as establishing the generic name. In his Monograph Loew does state "The characters of this genus , of which I hitherto only know South African and North American Species . . . .", and one might infer from this that Loew had published on this genus, but on the other hand he may have had such a paper only in preparation or only such specimens before him at that time. I cannot find the actual date of issue of that part of the Öfversigt, but should it have been published prior to that of the first volume of the Monographs (April 1862), then I herewith designate *Paralimna confusa* Loew as the type species of this genus. Until such priority be proven, the present genotype, *Paralimna appendiculata* Loew, must stand. Only one species was given under the generic description in the Monographs.

There are a few species described, mostly from the neotropics, which I have been unable to locate in my material, mainly on account of inadequate original descriptions. Rather than risk misidentification I prefer not to consider the names of such species. The correct status of these will be easily found when the types are examined and redescribed more accurately. Following is a list of these unrecognizable species with their original references:

1868. *Paralimna secunda* Schiner, Reise Novara, Zool., ii, Dipt., 241, [S. Am.]
1868. *Paralimna molossus* Schiner, Reise Novara, Zool., iii, Dipt., 242, [S. Am.]
1896. *Paralimna multipunctata* Will., Tr. Ent. Soc. London, 1896, 390, [St. Vincent.]
1902. *Paralimna nuda* Coq., Jour. N. Y. Ent. Soc., x, 182, [Mexico.] (This I have referred to the genus *Oedenops* Becker.)

The species possessing the generic characters as above given fall into two groups which are treated here as subgenera. These may ultimately prove to be valid genera, but from the present knowledge of the species I cannot consider them as such.

The two subgenera may be conveniently separated as follows:

The entire thorax and venter unicolourous; face less prominent. . . **Phaiosterna**
Pleura and venter more or less cinereous, contrasting with the dorsum; face large, swollen and prominent. . . . . **Paralimna**

Phaiosterna new subgenus

The species comprising this subgenus are so different from all the others in their color pattern and hardly less so in a few structural characters, that one naturally places them aside when

studying the genus. From the other species they differ most noticeably in the uniformity of the color over the entire insect, the usual grays of the face, pleura and abdomen being entirely absent. The abdomen is, however, generally banded with olivaceous but is never whitish. Structually the head is more flattened in profile; the face less prominent; eyes vertical, thus reducing the otherwise broad cheeks. In many respects the species here suggest a tendency towards *Dichaeta*.

Description.—Eyes vertical; face flattened, slightly convex; parafacalia linear; cheeks moderately broad; third antennal joint broad apically. Pleura and venter never cinereous.

Type species.—*Paralimna decipiens* Loew.

Table of Species

Opaque species ..... **decipiens** p. 108.
Shining species ..... **obscura** p. 109.

Subgenus **Paralimna**

The species comprising this subgenus are quite homogeneous in their color pattern and form a group that is not to be confused with the preceding. The group may be characterized as follows:

Description.—Eyes rounded; face large, broad, swollen, prominent, with more or less distinctly convex hump near middle, lower portion broad and vertical in profile; parafacials moderately broad; cheeks very broad. Third antennal joint tapering apically. Pleura and venter more or less cinereous.

Type species.—*Paralimna appendiculata* Loew (Subject to the condition mentioned in the discussion of the type of the genus *Paralimna*).

Description of Color Pattern.—The color pattern of the species of this group is so constant that the repetition of the same in each description of the species is superfluous. A general review of such characters is given here and will not be referred to again unless there are important differences.

Frons dark brown, more or less variegated with lighter labyrinthal markings which may vary in intensity of pattern or color or may be almost wanting; orbits more or less narrowly silvery with one or more interruptions; opposite the antennae or slightly below on the parafacials are usually present two opaque black spots separated by a silvery spot, best seen from the side. Clypeus concolorous with the face. Mesonotum light pruinose with numerous minute darker brown irrorations which sometimes coalesce into larger blotches; between the dorsocentral series may be two to three well defined dark stripes. Scutellum concolorous and irrorated, with apex more shining and black. Pleura and metanotum densely cinereous, becoming darker below, contrasting

with the mesonotum. Abdomen may said to be opaque cinereous with bases of each segment more or less broadly subglabrous brown with a median projection to apical margin; thus forming the ever present median stripe which, however, may be indistinct in some species. Sometimes the gray or brown is reduced to narrow bands, and the former more or less irrorated with brown. Legs normally black with bases of tarsi tawny. The males may be distinguished by having the apex of the abdomen truncate and convex.

Notes on the Classification of the Species.—Systematically the species are very unsatisfactory, the characters of most value being found in the male. By these the species may be divided into two groups, based on the ciliation of the fore femora, but this character shows some intergradation. However, one will have little difficulty in placing this sex of the species within these groups.

Of the species of this subgenus *plumbiceps* is most closely related to those of *Phaiosterna,* but is quite separate. This species with *flexinervis, ciliata* and *texana* form a distinct group, characterized by the peculiar ciliation of the fore femora of the male. In *texana* we have what seems to be an intermediate form suggesting *appendiculata* in other respects. In the latter we have one of the four species constituting what may be termed the typical group; the femora here not being ciliate, and the frons convex with the antennae situated well down about on a line with the middle of the eyes. Another group has the femora normal and frons convex, but with a silvery flattened spot on the second antennal joint above. This includes the two species *argyrostoma* and *puncticornis.* A third group has the frons flattened and horizontal, with the antennae situated above the middle line of the eyes. This group includes two species, *pleurivittata* and *taurus.* The latter is somewhat of an anomaly in its large heavy face with the upper parts very prominent.

The species may be systematically arranged as follows:

Fore femora of male ciliate beneath (fig. 7).
  Frons narrow..... **plumbiceps**
  Frons broad.
    Parafacials narrow..... **flexineuris, ciliata**
    Parafacials broad..... **texana**
Fore femora of male not ciliate.
  Frons convex, antennae opposite middle of eyes.
    Second antennal joint without flattened area above.
      Parafacials broad..... **appendiculata, nigropicta**
      Parafacials narrow..... **meridionalis, brunneiceps**

Second antennal joint with flattened area above.
argyrostoma, puncticornis
Frons flattened, horizontal, antennae above middle line of eyes.
Eyes horizontal ..... **pleurivittata**
Eyes round ..... **taurus**

Table of Species

1. Second antennal joint with a flattened, mostly silvery, area above at apex 2
Second joint normal 4
2. Mesopleura traversed by a broad brown stripe; frons and eyes horizontal ..... **plurivittata** p. 122.
Mesopleura cinereous or more or less irrorated and marked with brown at sutures; eyes round 3
3. Frons horizontal; face dark ..... **puncticornis** p. 121.
Frons convex; face white ..... **argyrostoma** p. 120.
3. Frons in profile flattened, horizontal; face long with well marked hump above middle (fig. 6) ..... **taurus** p. 123.
Frons convex; face short, without marked hump 5
5. Males 6
Females 11
6. Fore femora more or less constricted beneath on apical third and with mesal series of curved flattened bristles (fig. 7) 7
Fore femora and ciliation normal 9
7. Head at least as high as broad; frons and face narrow; latter opaque, plumbaceous ..... **plumbiceps** p. 110.
Head broader than high; frons and face broad; latter more or less sericeous 8
8. Lateral flexor series on fore femora simple, limited to a few bristles at basal fourth; parafacials narrow ..... **ciliata** p. 111.
Lateral series complicated, limited to basal half.
Second vein of wing curving, subparallel to costa (fig. 8).
flexineuris p. 111.
Second vein straight, normal ..... **texana** p. 113.
9. Face except foveae and parafacials entirely dark brown.
brunneiceps p. 120
Face mostly cinereous or yellowish brown 10
10. Parafacials at least one half as broad as third antennal joint.
appendiculata p. 114.
Parafacials much less than one half as broad as third joint.
meridionalis p. 119.
11. Frons broader than long 12
Frons not broader than long; face dull lead color . . **plumbiceps** p. 110.
12. Face with a velvety black spot between antennae . . . **nigropicta** p. 118.
This spot if present brownish 13
13. Face except foveae and parafacials entirely dark brown, not mottled with yellow ..... **brunneiceps** p. 120.
Face mostly cinereous or mottled with yellow or brown 14

14. Parafacials broader than one half of third antennal joint..... 15
Parafacials narrower, paralleling orbits..... 16
15. Lateral flexor series on fore femora of numerous bristles in series complete to apex.....**appendiculata** p. 114.
Lateral series of fewer bristles, series generally interrupted before apex.....**texana** p. 113.
16. Face dull, dark, sometimes nearly black.....**meridionalis** p. 119.
Face sericeous, light in color.....**ciliata** p. 111.

Paralimna (Phaiosterna) decipiens Loew Pl. IX, fig. 5.

1878. *Paralimna decipiens* Loew, Zeit. f. Ges. Naturf., 1878, 195.

?1893. *Drosophila excita* Giglio-Tos. Bol. Mus. Zool. Anat. Comp. R. Univ. Torino, VIII, 158.

It is possible that this species is not specifically distinct from the next. As treated here the species is typically opaque, with at most the abdomen somewhat shining, with bands generally well developed. The thorax may be more or less shining due to abrasion.

Description.—Black with yellow halteres. Opaque, head and thorax dark brown, yellow brown or olivaceous pruinose. Abdomen sub-opaque, olivaceous, with or without brown basal segmental bands, or, brown with or without traces of olivaceous apices to segments. Mesonotum generally with two or three dark vittae between dorso-centrals, being most distinct anteriorly.

Head broader than high. Eyes higher than broad. Frons broader than long; orbits nearly parallel; chaetotaxy normal. Face three-fourths width of vertex, slightly longer than broad, in profile, vertical with slight hump above middle; parafacials very narrow, concentric with orbits to cheeks; facalia sparsely setulose with one or more bristles. Cheeks about as broad as third antennal joint. Antennae with arista of 10 to 12 hairs.

Thorax and abdomen normal. Fore femora of male sparsely and weakly bristly below. Length.—2.5 to 3.5 mm.

Type.—Described from Texas. The type in the Museum of Comparative Zoology, Cambridge, Massachusetts. I have not examined it.

The variation in the pruinose color is considerable, ranging anywhere from dark brown to golden brown on the head and thorax, but the abdominal olivaceous bands are fairly constant in color although varying in extent. The thoracic vittation is also subject to variation in extent or may be absent. In poor and abraded specimens the pruinose vesture may be nearly absent so that the surface is shining. Of such specimens the student should be careful and not refer them to *obscura* Will., a form that may possibly be found with this. In the golden colored specimens the abdomen is generally olivaceous with the

brown reduced or wanting. Rarely are the olivaceous bands wanting. The specimens from Biscayne Bay and Lake Worth, Florida, may not belong here, and may be a distinct variety. They are shining but marked as this form.

Drosophila excita Gig.-Tos is probably one of the color varieties of this species. Mr. F. Knab of the U. S. National Museum called my attention to the probability of it being an Ephydrid.

Specimens Examined.—99.

GEORGIA: Billy's Island, Okeefenokee Swamp, June 1912, 1, [C. U.]; Spring Creek, Decatur Co., July 16–29, 1912, 1, [C. U.].

FLORIDA: 1, [A. M. N. H.]; 2, [Wash.]; Biscayne Bay, (A. T. Slosson), 2 [U. S. N. M.]; Bradentown, March, (M. C. Van Duzee), 4, [Van D.]; Crescent City, April 19, 1908, (Van Duzee), 1, [A. M. N. H.]; Lake Worth (Slosson), 1, [U. S. N. M.].

TEXAS: Austin, Oct. 6–20, 1901, 4, [Wash.]; 1, [Kans.]; Oct. 7, 1899, 2, [A. M. N. H.].

ARIZONA: Hot Springs, June 24, (H. S. Barber), 6, [U. S. N. M.]; Bill Williams Fork, August, (F. H. Snow), 14, [Kans.].

MEXICO: Frontera, Tabasco, May 9, (C. H. T. Townsend; on moist sand at river edge), 1, [U. S. N. M.]; Guadalajara, Aug. 8, 1905, (McClendon), 1, [A. N. S. P.].

GUATEMALA: Gualan, Feb. 15, 1905, 22, (J. S. Hine), [Ohio]; Los Amates, June 16–20, 1905, 1, (J. S. Hine), [Ohio].

COSTA RICA: Filadelfia, Jan. 18, 1910, (P. P. Calvert; muddy bank of Rio Tempisque), 1, [A. E. S.]; Santa Cruz, Rio de la Canas, Jan. 30, 1910, (P. P. Calvert), 5, [A. E. S.]; Cartago, May 25, 1909, (P. P. Calvert; along ditch), 9, [A. E. S.]; Cartago, July 4, 1909, (P. P. Calvert, 1, [A. E. S.].

PANAMA: Canal Zone, (A. H. Jennings), 1, [U. S. N. M.]; Ancon, Canal Zone, Dec. 4, 1909, (S. T. Darling), 9, [U. S. N. M.].

BERMUDA ISLANDS: July 29, 1905, (T. Kincaid), 1, [A. N. S. P.].

JAMAICA: April 1891, (Johnson), 4, [A. N. S. P.].

PORTO RICO: Mayaguez, Jan. 1899, (A. Busck), 2, [U. S. N. M.]; Utuado, Jan. 1899, (A. Busck), 1, [U. S. N. M.].

Paralimna (Phaiosterna) obscura Williston

1896. *Paralimna obscura* Williston, Trans. Ent. Soc. London, 1896, 391.

Whether or no this is a distinct species I am not prepared to say, for my series is hardly extensive enough to show the possible range of variation. However, there seems to be very well marked difference in the amount of opacity. In this form we have no absolutely opaque surfaces unless they are on the face and pleura. There may be considerable amount of pollen but not of sufficient density to subdue the gloss. Structurally the form does not differ

from *decipiens*. The specimens examined are all quite shining, dark brown or black, with faint olivaceous abdominal bands. The study of more material may show intergradations sufficient to relegate this form to varietal rank.

Type.—Described from numerous specimens from St. Vincent, West Indies. The type should be in the British Museum of Natural History. I am unable to examine the cotypes. These are supposed to be distributed as follows: three in the University of Kansas Collection and five in the American Museum of Natural History.

Specimens Examined.—14.

FLORIDA: Titusville, Nov. 8, 1911, 1, [A. M. N. H.].

COSTA RICA: Filadelfia, Jan. 18, 1910, (P. P. Calvert; muddy bank of Rio Tempisque), 1, [A. E. S.]; Santa Cruz, Rio de la Canas, Jan. 30, 1910, (P. P. Calvert; sweeping over mud), 2, [A. E. S.].

CUBA: Havana, (Baker), 3, [A. M. N. H.]; 1, [Johnson]; San Banos, 2, [U. S. N. M.].

PORTO RICO: Bayamon, Jan. 1899, (A. Busck), 1, [U. S. N. M.]; Fajardo, Feb. 1899, (A. Busck), 1, [U. S. N. M.].

BRAZIL: Rio de Janeiro, (H. H. Smith), 1, [A. N. S. P.].

PARAGUAY: (Fiebrig), 1, [H. N. M.].

Paralimna plumbiceps new species

This species belonging to the group in which the male fore femora are characteristically ciliated beneath, is, however, quite distinct in its narrow frons and face, and is easily distinguished by the dull lead color of the latter.

Description of Male.—Black; halteres yellow; base of tarsi tawny. Opaque; frons yellowish brown with design obscured, anterior half blackish; face, cheeks, clypeus, antennae, pleura, venter and legs, dull, bluish lead color; yellowish facial spots obscured. Mesonotum yellowish, with irrorations, large spots and three median vittae, brown. Scutellum concolorous. Mesopleura with large brown spot above. Abdomen with narrow gray fasciae which are somewhat oblique medianly; median stripe broad and well defined. Wings hyaline with yellow veins.

Head as high as broad. Eyes oblique. Frons long as broad. Face longer than broad with median hump rather distinct; Parafacials linear; upper bristles differentiated. Cheeks one-third as broad as eye. Arista with 8 to 10 hairs. Fore femora of male obliquely constricted beneath on apical fourth, with mesal ciliation of flattened, curved bristles; lateral ciliation of normal bristles in complete series extending to apex. Fore tibiae bent, with flexor surface flattened and bearing short ciliation. Wings normal. Length.—3.5. mm.

Female.—Similar with lateral flexor series on fore femora complete, but of few well separated weak bristles.

Type.—♂; Jamaica (Johnson), [A. N. S. P. Type No. 6090]. *Paratypes.*—4♂, 4♀; topotypical.

Specimens Examined.—10.
JAMAICA: (Johnson), 9, [Johnson].
CUBA: Baracoa, Nov. 1901, (A. Busck), 1, [U. S. N. M.].

Paralimna flexineuris new species Pl. IX, fig. 8.

In this species the resemblance to *texana* is evident. The difference, however, may be found in the more marked curvature of the second vein and the tuft-like arrangement of the lateral ciliation of the male fore femora. Unfortunately the abdomen of the only male specimen is missing. The markings on this may give additional characters of note. The females as usual are difficult to separate from those of other species. The correct status of this species is somewhat difficult to ascertain from such a small amount of material and from a locality which is poorly represented.

Description of Male.—Frons mottled with black and gray, overcast with bronze or light brown. Mesonotum cinereous and brown also similarly overcast; irrorations fine; vittae absent; mesopleura faintly irrorated. Face, clypeus, cheeks, third antennal joint, pleura and femora densely cinereous. Face immaculate, more or less sericeous, nearly white. Wings yellowish with cross veins slightly clouded.

In build similar to *texana*. Parafacials narrow but not as much so as in *ciliata*. (Abdomen missing.) Fore femora depressed beneath on apical third, with mesal ciliation of curved bristles; lateral series complicated, bushy, confined to basal half. Second vein markedly curved at middle causing the apical third to run subparallel to the costa (fig. 8). Length.—4.0 mm.

Female.—Similar, darker, cinereous only on the ventral portions. General color tinged with olive. Face mottled with yellowish brown. Cross veins of wings not clouded. Lateral flexor ciliation of fore femora consisting of a few bristles on apical half.

Type.—♂; Chosica, Peru, (C. H. T. Townsend; TD4197), [U. S. N. M. Type No. 19684]. *Paratypes.*—2♀; topotypical.

Paralimna ciliata new species Pl. IX, fig 7.

The present species is readily distinguished from *plumbiceps*. It is a member of the group including the two following species, from which it is separated by the characters given in the table of species, although the females will be found difficult to treat. However, there seem to be very good characters in the ciliation of the fore femora even in this sex of these species. Whether

this character is of value will have to be left for the future to determine. On the other hand there is the color pattern and general facies to guide the student who is familiar with this group. The present species may be separated from *texana* by the more yellowish abdomen with broader bands, and a distinct stripe; the narrower parafacials and the lateral cilia of the male fore femora confined to a single series on the basal third. From *flexineuris* it may be separated by the course of the second vein besides the other characters given in the description of that species. The females are similar to those of *meridionalis* but the face is more sericeous and the abdominal bands more oblique, besides averaging smaller in size. On the whole this species is distinctly lighter in general coloration owing to the less tendency of the irrorations to coalesce—the specimens from Guatemala being very noticeable in this respect.

Description of Male.—Black; halteres yellow; basal joints of tarsi tawny. Frons dark, nearly black, mottled with brown or ochreous; face cinereous to yellowish or sometimes grayish white, sericeous, with yellow spots; in certain aspects seemingly transversely banded with darker shade. Cheeks and clypeus concolorous. Mesonotum brownish gray, irrorations but slightly coalescing; vittae rather distinct. Scutellum concolorous. Mesopleura indistinctly irrorated, more or less brownish tinged above. Abdominal brown bands rather arcuate, obliquely terminated and dilated medianly; medial stripe well defined. Legs sparsely cinereous. Wings yellowish with cross veins slightly clouded.

Eyes rather oblique. Frons convex, broader than long. Face slightly longer than broad with few weak bristles; parafacial very narrow. Cheeks three-fourths of height of eyes. Arista with 7 to 10 hairs. Fore femora flattened and obliquely sulcate on apical third beneath; mesal cilia of distinct, flattened, curved bristles (fig. 7); lateral series normal, simple but confined to basal fourth; their tibiae not ciliate. Length.—3.5. mm.

Female.—Similar with lateral flexor cilia wanting or of a few weak bristles confined to basal part.

Type.—♂; Cartago, Costa Rica, Dec. 12, 1909, (P. P. Calvert; sweeping over mud), [A. E. S. Type No. 6091]. *Paratypes*—1♂, 1♀; topotypical.

Specimens Examined.—32.

FLORIDA: Bradentown, March 29, (M. C. Van Duzee), 2, [Van D.]; Fort Worth, (Mrs. Slosson), 1, [U. S. N. M.].

GUATEMALA: Gualan, Feb. 15, 1905, 9, (J. S. Hine), [Ohio]; Santa Lucia, Feb. 2, 1905, 1, (J. S. Hine), [Ohio.].

COSTA RICA: Banana River, 100 ft. alt., Nov. 9, 1909, (P. P. Calvert; sweeping near upper reservoir), 1, [A. E. S.]; Cartago, Oct. 27, 1909, (P. P.

Calvert; sweeping over mud), 1, [A. E. S.]; Nov. 21, 1909, 2; Dec. 12, 1909, 3; Jan. 3, 1901, 1; Southern slope of Irazu, north of Cartago, Dec. 15, 1909, (P. P. Calvert; sweeping over mud), 4, [A. E. S.].

JAMAICA: April 1891, (Fox & Johnson), 2, [A. N. S. P.].

ST. THOMAS, WEST INDIES: Feb. 8, (A. Busck), 5, [U. S. N. M.].

Paralimna texana Cresson

1915. *Paralimna texana* Cresson, Ent. News, xxv, 69.

This species while belonging to the *ciliata*-group is, however, very similar to *appendiculata* Lw. in general build and appearance; so much so that the females are very difficult to separate satisfactorily. The only character I can find to separate this sex from those of that species is in the stouter and lesser number of bristles in the lateral flexor series on the fore femora of this species. Whether or no this is constant my series is not large enough to determine. On the whole this species seems to average lighter; the forms not so liable to darken anteriorly; the abdomen whitish with the dark bands reduced, especially in the males, and the median brown stripe poorly defined or rudimentary, especially apically. Further than this my series is too small and many specimens in too poor condition to warrant more exhaustive study. The following description should suffice to characterize the species.

Its affinity to the Neotropical *ciliata* is evident. The character separating these may be found in the greater width of the parafacials in this species and the males having the lateral flexor ciliation rather clustered and not arranged in a distant series.

Description of Male.—Black; halteres pale yellow; tarsi except apically, tawny. Opaque, densely cinereous, more or less yellowish tinged. Frons ochreous, slightly darker on vertex and lighter in spots on orbits; design faint or obsolete; irrorations minute. Face and cheeks whitish sericeous, faintly yellow on hump and mesad of the upper bristles. Mesonotal irrorations well defined; vittae weak and only two medianly. Mesopleura faintly irrorated above. Abdomen whitish with the brown bands narrow, often wanting on fifth segment, attenuating mesally and laterally; median stripe narrow, poorly defined or incomplete; ventral lobes immaculate. Femora cinereous. Wings rather milky.

Frons much broader than long. Face as broad as long; in profile, convex with weak hump at middle; parafacial nearly as broad as third antennal joint. Cheeks nearly as broad as eye-height. Pile of antennae moderate; arista with 9–11 hairs. Fore femora flattened beneath with shallow, oblique sulci on apical third; mesal ciliation comprising of flattened, curved bristles;

lateral ciliation normal confined to basal third and rather clustered, not serially arranged. Second vein of wings straight; second costal section three times length of third; no appendages present. Length.—3.0 to 4.0 mm.

Female.—Similar, but lateral series on fore femora of six to ten bristles well separated and rather stout, sometimes the series is interrupted at apical third.

Type.—♂; Austin, Texas, Oct. 1900, [University of Washington]. *Paratypes.*—In the original citation of the typical series for this species a male of *appendiculata* was unintentionally included. Of the five females, four of these are in very poor, stained condition and practically of no value. However, I have a series before me of six males and three females, including the holotype and allotype, in good condition which may be considered typical.

Specimens Examined.—39.

KANSAS: Clarendon Siding, July 29, 1891, 1, [U. S. N. M.].

OKLAHOMA: Ardmore, April 4, 1907, (F. C. Bishopp), 1, [U. S. N. M.].

TEXAS: Oct. 7, 1899, 3, [Wash.]; Austin, 5; Feb. 12, 1900, 1; Mar. 2, 1900, 2; Oct. 1900, 5; Oct. 6–20, 1901, 6, all [Wash.]; Brownsville, July, 1, [Kans.]; Chinlan, Sept. 7, 1905, (F. C. Bishopp), 1; Clarendon, Aug. 11, 1905, (W. D. Pierce), 6; Corpus Christi, Apr. 13, 1906, (F. C. Pratt), 1; Dallas, June, 22, 1908, (E. S. Tucker), 1, all [U. S. N. M.]; Galveston, June 1900, 1; Granite Mountain, Mar. 30, 1901, 1, all [Wash.]; Rondo, May 1, 1908, (J. D. Mitchell), 1, [U. S. N. M.]; Round Mountain, 1, [A. N. S. P.]; Waco, (Belfrage), 1, [U. S. N. M.].

The male from Brownsville, Texas is a fine specimen, well marked, with the face glistening bluish-white.

Paralimna appendiculata Loew Pl. IX, figs. 1, 2, 3, 4.

1862. *Paralimna appendiculata* Loew, Mon. Dipt. N. Am., i, 138.

In this we have the commonest species of the genus inhabiting the Nearctic region, and it is found all over the United States east of the Rocky Mountains. Although a few other species have been generally confused with it, fortunately it is involved in little or no synonymy. It has, however, some variations which are confusing and are liable to be considered distinct forms by those not having an extensive series for study.

This species, as I consider it, has the face and parafacials broad, of a silky lustre when in good condition. In rare cases the face is narrow and dull lead color. Generally the face is yellowish gray with stains of yellow or brown, sometimes largely brown or on the other hand silvery gray to almost white. The parafacials

are broad, usually as broad as the third antennal joint, but often narrower; however, never linear and concentric with the orbits. The frons are generally dark with lighter areas about the bristles and the ocellar triangle, conspicuous, sometimes in very dark colored specimens these markings are, or nearly, obsolete; in which cases the face is usually more leaden in color.

The males have the ciliation of the fore femora normal. Of course those species having the flattened area on the antennae must not be confused with this. The following description is full, this species being the genotype.

Description.—Black; base of tarsi more or less tawny to yellow, sometimes black; halteres white or yellowish; wings hyaline with cross veins and appendages generally clouded; veins dark.

Opaque. Frons dark brown, more or less intricately varied with lighter markings, or sometimes nearly black; the lighter markings, gray or yellowish, are most distinct as orbital spots and subcircular areas surrounding the ocellar tubercle and the shining black spots at the base of the bristles. Face varying from almost silvery to dark brown, generally with three yellow to brown spots, one on the carina and the other two mesad of the upper bristles; parafacial spots distinct. Cheeks, clypeus, lower orbits and post orbits gray. Third joint of antennae in certain angles somewhat gray or yellowish.

Mesonotum gray to ochreous with numerous dark brown irrorations which sometimes coalesce forming large areas of such color; between the dorsocentral rows there are generally, especially anteriorly two or three dark stripes. Pleura and metanotum gray; mesopleura and scutellum irrorated with dark brown, rarely immaculate. Sternopleura and pectus darker to nearly black. Abdomen gray to yellowish, more or less irrorated; bases of third to fifth segments dark brown, more shining, which color attenuates laterally and medianly with more or less distinct medial extenuation attaining the apical margins; forming a pair of brown median stripes; second segment with the stripes seldom complete and the brown basal areas usually isolated or limited to the lateral angles. Legs sparingly dark brown pruinose. All bristles black with more or less distinct shining black spot at their bases.

Head as broad as high or broader. Eyes round or slightly oblique. Frons nearly one and a half times as broad as long, about half as broad as head, sparingly setulose anteriorly; orbits parallel. Face as broad or broader than long, rarely narrower; facalia broad, setulose, with two or more medianly curved bristles, the uppermost being strongest and at middle of profile. Cheeks one- to two-thirds diameter of eyes. Third antennal joint longer than broad, subconical, long pilose above (fig. 4). Abdominal segments subequal; sixth of male just visible, roundly truncated. Fore femora of male densely ciliate on lateral flexor margin with normal bristles in series complete to apex; mesal series weak. Wings with second costal section two and a half to three and a half times as long as third; fourth vein generally emitting one or more stumps

or appendages into the first posterior (fig. 1), and sometimes into the discal cell; sometimes these extend to the third vein as a cross vein or are reduced to isolated spots in the cells, but always enveloped in a cloud. Rarely are these appendages entirely absent, but all possible intergradations exist. Length.—2.0 to 4.5. mm.

Type.—Described from both sexes from the Middle States and Georgia. Type in Coll. Museum of Comparative Zoology. I have not seen it.

A very variable species, which, in a genus possessing so few well marked characters, is difficult to characterize. Its similarity to *meridionalis* is evident and in some cases it is almost impossible to separate them. The presence or absence of the stump on the fourth vein is soon found to be of no specific value, at least I have been unable to find it constant. In a few specimens I find it well developed in one wing and totally absent in the other. However, it is noticed that the specimens from Texas and New Mexico generally lack these appendages, those from the Central and Southeastern states may or may not have them, while in those from the more northern states they are seldom absent. The face although varying little in shape does vary in color, from a bluish-white to nearly brown. The frons ranges from grayish with faint irrorations and marks to very dark. The thorax especially the mesonotum may be nearly unicolorous with faint irrorations or dark brown, with or without the median stripes. The brown of the abdominal segments may occupy almost the entire segment or limited to narrow spots on each side of the gray medial stripe.

I have been tempted to separate some of the more marked variations but could get no satisfactory results. There is one which may prove to be worth recognizing. In this the sternopleura and femora are decidedly gray and the wings somewhat lactaceous. This series I have labeled *appendiculata* var.? but have not recognized it otherwise.

There are also two specimens before me from Florida, Jacksonville, (C. W. Johnson) and Bradentown, March, (M. C. Van Duzee) which are in too poor a condition for critical study. They are noticeably larger (4.7 mm.) but seem to belong here or are allied. I have also a series from North Carolina and Georgia which average smaller than usual, are darker, with the face narrower and the legs black, scarcely brown pruinose.

Specimens Examined.—377.

NEW YORK: Ithaca, 1, [C. U.].

PENNSYLVANIA: Dauphin, June, 2, [Daecke]; Lansdale, May 30, 1909, 1; (E. T. Cresson), 1, [A. E. S.]; Manayunk, 1 (C. W. Johnson), 1, [A. N. S.]; Swarthmore: June 4, 1905, 2; June 4, 1906, 1; July 1908, 2; Aug. 1908, 20; June 6, 1909, 2; June 13, 1909, 1; July 4, 1909, 5; Aug. 22, 1909, 2; Sept. 26, 1909, 1; July 31, 1910, 1; Aug. 21, 1910, 1; Aug. 28, 1910, 1, all (E. T. Cresson, Jr.), [A. E. S.].

NEW JERSEY: Riverton, May–July, 3, [H. N. M.].

MARYLAND: 6, [U. S. N. M.]; Bay Ridge, Aug. 6, 1899, 1, [Ohio]; Beltsville, Sept. 26, 1911, (F. Knab), 2, [U. S. N. M.]; Bladensburg, Oct. 2, 1914, (R. C. Shannon), 1, [U. S. N. M.]; Sept. 23, 1915 (R. C. Shannon), 1, [U. S. N. M.]; Sept. 16, 1915, (R. C. Shannon), 5, [U. S. N. M.]; College Park, May 25, 1913, (F. Knab), 1, [U. S. N. M.]; Hyattsville, Sept. 1, 1912, (Knab & Malloch), 3, [U. S. N. M.].

DISTRICT OF COLUMBIA: 1, [U. S. N. M.]; Anacosta, May 4, 1913, (P. R. Myers), 1, [U. S. N. M.]; Washington, (N. Banks), 1, [Banks].

VIRGINIA: Boykins, June 10, 1896, 1, [H. N. M.]; Dead Run, Fairfax Co., June 29, 1915, (R. C. Shannon), 1, [U. S. N. M.]; Difficult Run, Sept. 14, 1913, (R. C. Shannon), 1, [U. S. N. M.]; Falls Church, May 5, (N. Banks), 1, [Banks]; May 20–30, (N. Banks), 6, [Banks]; June 9, 14, 16, 20, (N. Banks), 4, [Banks]; Sept. 7, (N. Banks), 2, [Banks]; Aug. 3, 1914, (R. C. Shannon), 3, [U. S. N. M.]; Glencarlyn, May 9, (N. Banks), 3, [Banks]; near Plummer's Island, May 20, 1914, (R. C. Shannon,) 2, [U. S. N. M.]; Ocean View, Aug. 9, (A. N. Caudell), 4, [U. S. N. M.]; Rosslyn, May 15, 1913, (R. C. Shannon), 3, [U. S. N. M.]; Virginia Beach, Aug. 14, 1913, (F. Knab), 9, [U. S. N. M.].

NORTH CAROLINA: 9, [U. S. N. M.]; Beaufort, June 18, 1908, (F. Sherman), 1, [C. U.].

GEORGIA: 7, [U. S. N. M.]; South Georgia, (Morrison), 2, [U. S. N. M.]; 2, [C. U.]; Atlanta, Aug. 2, 1913, 1, [C. U.]; Austell, Aug. 27, 1910, 2, [C. U.]; Billy's Island, Okeefenokee Swamp, June 1912, 6, [C. U.]; July 1912, 1, [C. U.]; Blackshear, May 10, 1911, 2, [C. U.]; Clayton, 2000 ft. alt., May 18–26, 1911, (J. C. Bardley), 2, [C. U.]; De Witt, July 24, 1912, 1, [C. U.]; Spring Creek, Decatur Co., June 7–23, 1911, (J. C. Bradley), 1, [C. U.]; July 16–29, 1912, 16, [C. U.]; Thomasville, Mar. 22, 1909, 1, [Johnson].

FLORIDA: Eastern Fla., (Ashmead No. 3968), 1, [U. S. N. M.]; Crescent City, Apr. 20, 1908, (E. P. Van Duzee), 1, [A. M. N. H.]; Jacksonville, Mar. 31, 1913, 2, (M. C. Van Duzee), 2, [Van D.]; St. Petersburg, Aug. 12, 1910, (J. C. Bradley), 1, [C. U.].

MISSISSIPPI: 1, [U. S. N. M.]; Holly Springs, Sept. 4, 1890, (F. W. Mally), 1, [U. S. N. M.]; Aug. 28, 1891, (F. W. Mally), 1, [U. S. N. M.]; Jackson, Oct. 30, 1894, 5, [Johnson]; Utica, Aug. 7, [U. S. N. M.].

LOUISIANA: Logansport?, Mar. 24, 1908, (E. S. Tucker), 3, [U. S. N. M.]; Mound, May 24, 1907, (F. C. Bishopp), 2, [U. S. N. M.]; Opelousas, Apr. 9, 1, [Wash.]; May 7, 1908, (R. A. Cushman; on Polygonum), 1, [U. S. N. M.]; Shreveport, May 7, 1891, (F. W. Mally), 1, [U. S. N. M.]; June 1, 1891, (F. W. Mally), 1, [U. S. N. M.]; Slidell, July 2–6, 1902, 3, [Ohio].

OHIO: Akron, Aug. 16, 1; Cincinnati, June 9–16, 1901, 1; Columbus, May 9, 1899, 1; May 29, 2; Ironton, May 26, 2; Sandusky, July 1913, 2; Sugar Grove, May 19, 1; Vinton, June 5–12, 1900, 2; Wauseon, Aug. 23–29, 1902, 28, all [Ohio].

ILLINOIS: Chicago, 1, [C. U.]; Grand Tower, June 30, 1909, (sweeping from grass), 2, [Ill.]; Muncie, July 24, 1909, 1; Murphysboro, May 16, 1910, 3; Odin, May 10, 1910, (sweeping), 2; May 31, 1910, (sweeping in meadow), 1; June 1, 1909, (sweeping), 1; Pulaski, June 28, 1909, (Cypress swamp), 4, all [Ill.]; Rockford, Sept. 8, 1898, 1, [Wash.]; Thebes, July 31, 1905, 1, [Ill.].

MISSOURI: Columbia, May 26–June 8, 1906, (C. R. Crosby), 38, [C. U.].

NEBRASKA: 1, [C. U.]; Fremont, July 17–18, 1909, 4, [C. U.]; Neligh, June 20, 1909, (J. T. Zimmer), 1, [Neb.].

KANSAS: Sept. 1, [Kans.]; Baldwin, June, (J. C. Bridwell), 1, [Ohio]; Garden City, June 1895, (C. F. Adams), 1, [Kans.]; Douglas Co., (F. H. Snow), 5, [Kans.]; May, (U. of K. Lot 31), 1, [Wash.]; Morton Co., 3200 ft. alt., (C. F. Adams), 1, [Kans.]; Onagra, 1, [U. S. N. M.]; May 19, 1901, 2, [Ohio].

OKLAHOMA: Ardmore, Apr. 11, 1907, (F. C. Bishopp) 4, [U. S. N. M.].

TEXAS: Austin, Mar. 2, 1900, 3, [Wash.]; Oct. 1900, 1, [Wash.]; Calvert, Apr. 19, 1906, (W. W. Yothers), 1, [U. S. N. M.]; Clarendon?, Aug. 4, 1905, (W. D. Pierce), 2, [U. S. N. M.]; Clarendon, Aug. 11, 1905, (W. D. Pierce), 1, [U. S. N. M.]; Denison, June 22, 1904, (H. S. Barber), 3, [U. S. N. M.], Jacksonville, Oct. 20, 1894, 1, [Johnson]; Liberty, Mar. 18, 1908, (E. S. Tucker), 6, [U. S. N. M.]; Richmond, Mar. 14–19, 1907, (Cushman & Pierce; on *Rubus*), 2, [U. S. N. M.]; San Augustine, Oct. 13, 1895, 1, [Johnson]; Oct. 19, 1896, 1. [Johnson]; Victoria Apr. 5, 1907, (J. D. Mitchell), 1, [U. S. N. M.]; June 21, 1909, (J. D. Mitchell), 3, [U. S. N. M.]; Waco, (Belfrage), 2, [U. S. N. M.];

COLORADO: 4, [U. S. N. M.]; Colorado Springs, 5915 ft. alt., July, (E. S. Tucker), 3, [Kans.]; Aug. (E. S. Tucker), 2, [Kans.]; Ute Creek, Aug. 7, (R. W. Dawson; on sage flats), 3, [Neb.].

NEW MEXICO: Des Moines?, June 18, 1910, (F. C. Bishopp), 5, [U. S. N. M.]; Highrolls, May–June 1, 1902, (Viereck & Rehn), 6, [A. N. S. P.]; Pecos, July 1, (T. D. A. Cockerell), 2, [U. S. N. M.]; Rio Ruidoso, White Mts., 6500 ft. alt., July, 30, (Townsend; on rocks by stream), 1, [U. S. N. M.].

ARIZONA: Douglas, San Bernardino Ranch, 3750 ft. alt., Aug. (F. H. Snow), 1, [Kans.]; Oak Creek Canon, 6000 ft. alt., Aug. (F. H. Snow), 1, [Kans.].

GUATEMALA, all (J. S. Hine), [Ohio]; Gualan, Feb. 15, 1905, 1; Los Amates, Jan. 16–20, 1905, 1; Puerto Barrios, Mar. 3–14, 1905, 2.

Paralimna nigropicta new species

This species, represented by a small series of females, is distinguished from all others by the velvety black spot between the bases of the antennae. In some of the other species there may be a brown stripe or spot here but it is never velvety black. There seem to be no variation in this respect.

Description of Female.—Similar to *appendiculata* but with a round velvety spot between bases of antennae. Face, pleura and femora densely cinereous. Yellowish spots on face faint or confined to the one on the hump below the black spot. Ciliation of fore femora weak. Parafacials moderately narrow. Abdomen mostly brown with interrupted cinereous apical bands on segments more or less dilated medianly; venter cinereous with irrorations. Wings hyaline with yellowish tinge; cross veins more or less clouded; no stump on fourth vein. Length.—3.5 to 4.0 mm.

Type.—♀; Puerto Barrios, Guatemala, March 3–14, 1905, [Ohio State Univ.]. *Paratypes.*—2 ♀; topotypical. 1 ♀; Los Amates, Jan. 16–20, 1905. 1 ♀; Gualan, Feb. 15, 1905; all in Guatemala, [Ohio].

Paralimna meridionalis new species

Allied to *appendiculata* but evidently distinct, although the characters of differentiation are very weak. On comparison with that species, those belonging here have the head, especially the frons and face, narrower, appearing longer in proportion to the width. The face generally of a dark dull color, not sericeous, with a dark dash of brown or yellow on the carina between and a spot or dash laterad of each upper bristle. Eyes oblique, causing the parafacials to become narrower; the groove is more concentric with the orbits. Special attention should be given to the latter character. The orbital spot is less distinct, and the gray abdominal bands are always broadly interrupted and less dilated medianly. Fore femora of the male with lateral ciliation of close bristles, sometimes arranged in double series basally; mesal series of short bristles in one row; lateral series in the female complete, well developed.

Type.—♂; La Carpentera, Costa Rica, Dec. 4, 1909, (P. P. Calvert), [A. E. S. Type No. 6092.] *Paratypes.*—5, topotypical.

Specimens Examined.—40.

GUATEMALA: Puerto Barrios, Mar. 3–14 1905, 1; Los Amates, Feb. 18, 1905, 1; Santa Lucia, Feb. 2, 1905, 2, all [Ohio].

COSTA RICA: Alajuela, 3100 ft. alt., Sept. 15, 1909, (P. P. Calvert; sweeping), 1; Banana River, Upper Reservoir, Nov. 9, 1909, (Calvert; sweeping), 1; Cachi, Rio Reventazon, Mar. 10, 1910, (Calvert; stagnant pool near bank), 1; Cartago, July 4, 1909, (Calvert), 9; Oct. 27, 1909, (Calvert), 1; Dec. 12, 1909, (Calvert; sweeping over mud), 1; Irazu Volcano, near Cartago, 5000 ft. alt., Dec. 15, 1909, (Calvert; over mud), 7; La Carpentera, Dec. 4, 1909, (Calvert), 6; Bonnefil Farm, Rio Surubres, Oct. 21, 1909, (Calvert; sweeping), 2; Turrucares, Dec. 21, 1909, (Calvert; sweeping over mud), 1, all [A. E. S.].

PANAMA: Paraiso, Dec. 19, 1909, (A. H. Jennings), 1; Jan. 16, 1911, (A. Busck), 1; Tabernilla, Apr. 29, 1907, (A. Busck), 1; Rio Trinidad, Mar. 20, 1912, (A. Busck), 1, all [U. S. N. M.].

PERU: Calanga, 1, [H. N. M.].

ARGENTINA: Tucuman, May 8, 1914, (T. C. Barber), 1, [U. S. N. M.].

A series of female before me show a slight variation which may prove to be worthy of note. The sternopleura, especially the sutures, also the femora are blackish, and the wings are hyaline with the cross veins faintly clouded. A male from the same series, however, does not show these differences so I hesitate to consider this form at present as a variety worthy of a name.

Specimens Examined.—25.

BRAZIL: Bonito, Prov. Pernambuco, Jan. 18–22, 1885, 2, [U. S. N. M.].

PARAGUAY: (Fiebrig), 1, [H. N. M.].

ARGENTINA: Tucuman, April 18, 1913, (Barber and Rosenfeld), 1♂, 6♀, [U. S. N. M.]; May 8, 1914, (T. C. Barber), 15, [U. S. N. M.].

Paralimna brunneiceps new species

This is hardly a variety of *meridionalis* although the parafacials are narrow, much narrower than in that species. The constant brown color of the face is, I think, of specific value.

Description of both sexes.—Entire face between the parafacials and below the foveae evenly dark brown. Parafacials very narrow, almost linear; cheeks scarcely longer than third antennal joint. All the lighter areas darker than usual except the foveae and abdomen; pleura brownish. Otherwise similar to *meridionalis*. Length.—3.5 to 4.4. mm.

Type.—♂; Turrucares, Costa Rica, Dec. 22, 1909, (P P. Calvert; sweeping over mud), [A. E. S. No. 6093]. Paratypes.—2♀; topotypical.

Specimens Examined.—13.

GUATEMALA: Gualan, Feb. 15, 1905, (J. S. Hine), 1, [Ohio].

NICARAGUA: Chinandega, (Baker), 2, [U. S. N. M.].

COSTA RICA: Alajuela, 3100 ft. alt., Sept. 8, 1909, 3; Sept. 15, 1909, 1, both (P. P. Calvert; sweeping over mud), [A. E. S.]; Rio Siquiares, Dec. 19, 1909, (Calvert), 2, [A. E. S.]; Turrucares, Dec. 22, 1909, (Calvert; sweeping over mud), 3, [A. E. S.]; Bonnefil Farm, Rio Surubres, 800 ft. alt., Oct. 21, 1909, (Calvert; sweepings), 1, [A. E. S.].

Paralimna agryostoma new species

The present species should not be confused with any other. The white face, general olivaceous color and silvery antennal spot will distinguish it.

Description of both sexes.—The general color inclining to olive-green instead of brown, that is the grays and browns tinged with green, except the cinereous occiput, pleura and venter. Frons mottled; the black orbital spot large enroaching on the foveae, with minute white spot. Face and cheeks gray to shining white, more or less yellowish tinged on hump. Second antennal joint with distinct white spot above near apex. Mesonotum indistinctly irrorated,

with rather distinct vittae. Mesopleura immaculate. The median brown abdominal stripe well defined. Femora and tibiae anteriorly densely cinereous; knees and bases of tarsi yellowish. Wings yellowish hyaline; cross veins slightly clouded.

Frons convex, scarcely broader than long. Face one and a half times as long as broad, with only one strong facial bristle; parafacial very narrow, linear. Cheeks about half as high as the eye. Second antennal joint with a small flattened area above near apex in which is situated the white spot; arista long with 8–10 hairs. The bristles of the frons and thorax are unusually long. The ciliation of femora microscopic. Length.— 2.8 mm.

Type.—♂; Banana River, Costa Rica, Nov. 9, 1909, (P. P. Calvert), [A. E. S. No. 6094]. *Paratypes.*—5 ♂, 1 ♀; topotypical.

Specimens Examined.—8.

COSTA RICA: Banana River, 100 ft. alt., Nov. 9, 1909, (P. P. Calvert; sweeping near upper reservoir), 7, [A. E. S.]; Rio Aranjuez, Puntarenas, Sept. 15, 1905, (F. Knab), 1, [U. S. N. M.].

Paralimna punctipennis new species

Here we have a form in which the frontal design is very strongly and completely developed. The frons is rather horizontal but the eyes are round, large, so the species should not be confused with *pleurivittata.*

Description of Female.—Black; halteres and base of tibiae tawny. Generally yellowish gray and brown, becoming gray ventrally. Frons brown with distinct labyrinthine lighter markings, the stripe from the ocelli converging anteriorly. Face mottled; facalia and a pair of spots on median area below hump brown; parafacials and cheeks lighter; clypeus brownish. Antennae with silvery spot on second joint above.

Irrorations of mesonotum coalescing into irregular vittae; mesopleura and scutellum irrorated with brown. Sternopleura blackish below. Grays of abdomen narrow except on second segment and broadly interrupted medianly; venter brownish medianly. Femora faintly grayish. Wings brownish hyaline; c. v. narrowly clouded.

Eyes large, round. Frons broader than long, rather horizontal but convex. Face nearly as broad as long, prominent; hump and foveae weak; parafacials very narrow. Antennae situated above middle line of eyes; second joint with flattened area above near apical margin; third joint small; arista with 12 to 14 hairs. Cheeks one-fourth height of eyes. Wings with second vein slightly bent; third costal section twice as long as second. Length.— 4.0 mm.

The males are similar with normally ciliated femora.

Type.— ♀; Peralta, Costa Rica, March 24, 1910, (P. P. Calvert; sweeping over muddy road), [A. E. S. No. 6095].

Specimens Examined.—5.

COSTA RICA: Peralta, Mar. 24, 1910, (P. P. Calvert; sweeping over muddy road), 1, [A. E. S.].

PANAMA: Paraiso, Canal Zone, Jan. 16, 1911, (A. Busck), 1, [U. S. N. M.]; Tabernilla, Canal Zone, July 31, 1907, (A. Busck), 1, [U. S. N. M.].

COLOMBIA: Sierra San Lorenzo, (Ujhelyi), 2, [H. N. M.].

Var. **captiosa** new variety

Color more subdued and markings less distinct. Face more evenly yellowish or brownish gray; facalia not darker. The grays of the abdomen more dilated medianly. The male with the mesal ciliation of fore femora consisting of somewhat flattened but smaller bristles.

Type.—♂; Montserrat, Trinidad, West Indies, July 4 1905, (A. Busck), [U. S. N. M. No. 19685]. *Paratypes.*—2♂; topotypical.

Specimens Examined.—6.

TRINIDAD: Montserrat, July 4, 1905, (A. Busck), 3, [U. S. N. M.].

BOLIVIA: Cillutincara, 1, [H. N. M.]; Coroico, 2, [H. N. M.].

The specimens from Bolivia may belong to a distinct species. The silvery antennal spot is rather indistinct and the flattened area not noticeable. They may be closely allied to *flexineuris*.

Paralimna pleurivittata new species

This species is distinct in its horizontal eyes and frons, no other species known having them so to such a degree. The only other one approaching it in this respect is *taurus*, but that species has the eyes round. The present species may seem to belong to the group in which the second antennal joint has the flattened silvery spot, but probably represents another distinct group.

Description of both sexes.—Black; halteres and basal joints of tarsi, tawny. General color dull yellowish gray and brown with pectus and metanotum dull cinereous. Frontal design complicated, more or less distinct; the lighter stripe from the ocellar bristles subparallel. Face gray tinged above with brown. Second antennal joint with silvery spot above. Cheeks lighter. Mesonotal irrorations obscure; two or three median vittae indistinct; laterad of the dorso-centrals at the suture and extending obliquely to the post-alar region is a broad brown stripe, also a similar stripe extending over the prostigma and mesopleura to the pteropleural suture. Scutellum concolorous with mesonotum. The grays of the abdomen broad laterally, attenuated mesally and broadly interrupted except that of second segment. Venter brown, laterally gray. Femora weakly ciliated. Wings brownish hyaline with all veins narrowly, and the c. v. more broadly, clouded.

Eyes horizontal, not rounded or vertical. Frons broader than long, horizontal. Face much longer than broad, prominent, retreating below with

weak hump. Parafacials very narrow. Cheeks half height of eyes. Antennae well above middle line of eyes; arista with 12 to 14 hairs. Femora weakly but normally ciliated. Wings with second vein slightly curved; second costal section nearly three times the length of third. Length.—3.5 to 4.0 mm.

Type.—♂; Callanga, Peru, [Hung. Nat. Mus.]. *Paratypes.*—3♂, 1♀; topotypical.

I have not seen any specimen from other localities.

Paralimna taurus new species Pl. IX, fig. 6.

The specimen selected as the type of this species is one of three received from Dr. Williston as *P. multipunctata*, and is one of those belonging to the series from Brazil determined by him as that species. However, I cannot consider his determination conclusive. The three specimens I have are much larger than the size given for the St. Vincent material. As I have said elsewhere, I must have better descriptions to follow or must examine the types of many of the heretofore described species, especially of the early authors, before I can recognize them.

This species is apparently allied to *meridionalis* and is sometimes not easy to separate. It is based on the bold profile of the head, with its long face caused by the prominence of the anterior part of the frons and upper face, thus making the frons more horizontal and flattened than usual (fig. 6). The facial hump is well defined and prominent, with deep foveae.

Description of both sexes.—Similar to *meridionalis*. Head high as broad, Eyes round or slightly horizontal. Frons broader than long, flat, horizontal. abruptly angulated with the face; orbits at vertex angular. Face three-fourths as broad as vertex, nearly as high as head, much longer than broad, with prominent hump and distinct foveae, retreating slightly below; parafacials half as broad as third antennal joint, gradually dilating below; facalia distinctly setulose. Cheeks half as broad as eyes. Scutellum flat. Fore femora normal. Length.—3.5 to 5.5. mm.

Type.—♂; Corumba, Brazil, May, (H. H. Smith), [A. E. S. No. 6096]. *Paratypes.*—1♂, 1♀; topotypical.

Specimens Examined.—14.

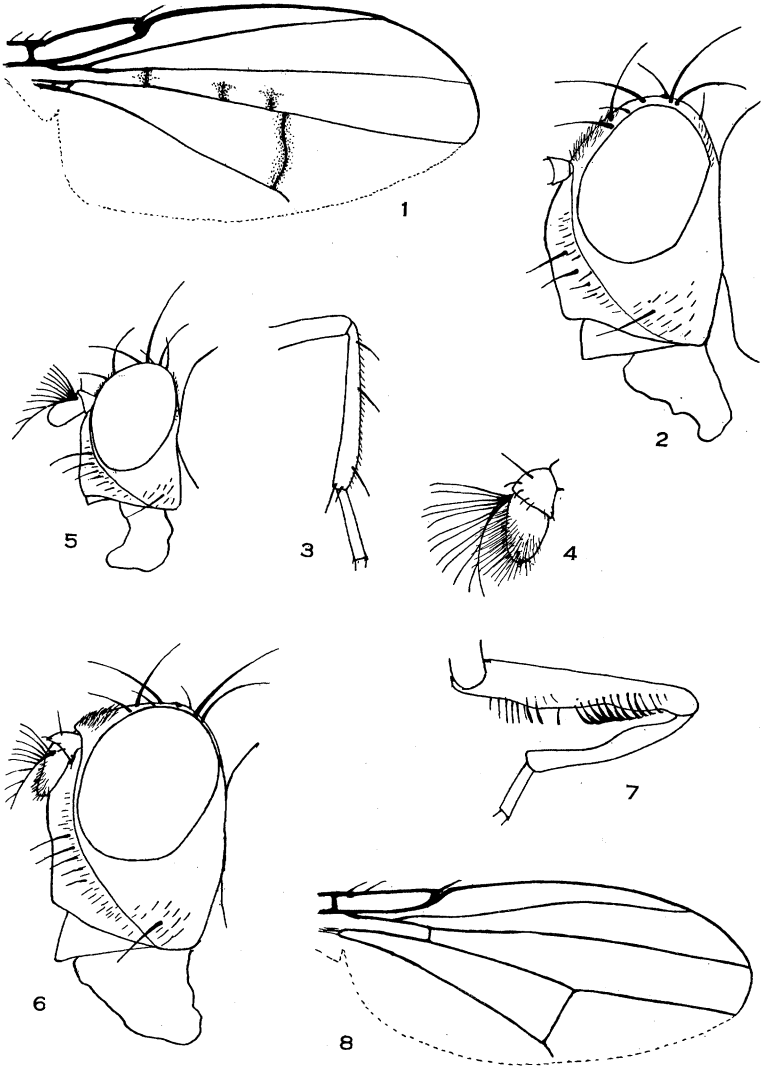
GUATEMALA: Puerto Barrios, Mar. 13–14, 1905, (J. S. Hine), 7, [Ohio]; Santa Lucia, Feb. 2, 1905, (J. S. Hine), 2, [Ohio].

BRAZIL: Corumbá, May, (H. H. Smith), 3, [A. E. S.].

PARAGUAY: (Fiebrig), 2, [H. N. M.].

EXPLANATION OF PLATE IX

Fig. 1.—*Paralimna appendiculata.* Wing. X 18.
Fig. 2.—*Paralimna appendiculata.* Profile of head. X 22.
Fig. 3.—*Paralimna appendiculata.* Middle tibia. X 22.
Fig. 4.—*Paralimna appendiculata.* Antenna. X 35.
Fig. 5.—*Paralimna decipiens.* Profile of head. X 22.
Fig. 6.—*Paralimna taurus.* Profile of head. X 22.
Fig. 7.—*Paralimna ciliata.* Fore femur and tibia. X 35.
Fig. 8.—*Paralimna flexineuris.* Wing. X 18.



E. T. CRESSON, JR. — AMERICAN EPHYDRIDAE